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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/634,434	08/05/2003	David Cope	EMI.1002	8296

7590 08/23/2006

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EXAMINER	
RUTLAND WALLIS, MICHAEL	
ART UNIT	PAPER NUMBER
2835	

DATE MAILED: 08/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/634,434	COPE ET AL.	
	Examiner	Art Unit	
	Michael Rutland-Wallis	2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 July 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant points the IEEE publication is limited to third order and odd harmonics and the Hingorami reference address similar harmonics and does not address even harmonics and DC current sufficiently. The office submits this is the case in the IEEE publication, however, as these are not relied upon in the rejection and wherein sufficient discussion of second or even ordered harmonics is discussed in the primary teaching of Kern the deficiencies of the IEEE publication and Hingorami are moot.

Applicant's arguments filed 07/17/2006 concerning the 103 prior art rejection have been fully considered but they are not persuasive.

Applicant alleges neither reference (Kern or Liu) teaches applying a current to a winding to offset a flux created by DC current nor teaches how to correct DC in the transmission line. Applicant identifies the alleged missing elements in bold in the recitation of the claims within the remarks.

With respect the limitation "evaluating an amount of DC current resulting from the DC in a transmission line" applicant states in page 3 of the remarks "Kern is directed to correcting and evaluating DC current resulting from load devices..." The system disclosed in Kern is identified as a power distribution system. In other words Kern is concerned with generating power at a source and then supplying the power to a grid or AC loads, as identified in the rejection to claim 1 (column 3 lines 13-36). Kern evaluates

and mitigates the effects of even harmonics, which in turn cause a DC current, between a power source and a load. The even harmonics in the system create a DC current and via item 24 DC is injected to control the shape of the waveform and an output current of the control system through a feedback configuration. Therefore Kern teaches "evaluating an amount of DC current resulting from the DC in a transmission line".

With respect to the limitation "offset a flux created by said DC current" Kern provides a harmonic analyzer to detect and evaluate the second order harmonics after the second harmonics are evaluated a controller then outputs an offset by way of item 24 to substantially zero out harmonic and substantially eliminate the DC in the line, see column 9 line 26 – column 10 line 8. The offset output in the DC offset adjust device or in the converter would have flux as movement of charge is being injected into the power converter to cause the elimination of even ordered harmonics. Therefore Kern teaches, "offset a flux created by said DC current".

Applicant alleges neither reference discloses how to correct DC current originating in a transmission line nor does applicant consider the references are directed toward transmission line arrangements. In response the office points out Kern discloses a power distribution system comprising a source to connect and supply a grid; certainly such a connection comprises a transmission line in order to feed the grid or load with generated power. Liu teaches lines connected above locomotives these lines as well constitute transmission lines. No special definition is given to the term "transmission line" if applicant intends a particular type of transmission line, such limitation should be added to the claimed limitation of claim 1.

Applicants also provide arguments directed toward the motivation used in the combination of Kern and Liu. The DC mitigation method of Kern is addressed using high level block diagrams and more directed to overall layout of the system. Kern does not describe detailed control switches configured in the control system (item 20) of the power distribution system seen in figure 1 of Kern, to provide current into windings of a transformer that offsets the evaluated current. Liu provides a teaching of using switches (Fig. 1 item 10 and 11 solid state switches comprising a IGBT or thyristor switch) for providing a current into a winding of a transformer, in order to mitigate or dampen harmonic frequencies. It remains the position of the office the use of switches to provide the offset current described in Kern by way of windings would have obvious to one of ordinary skill in art. As Kern suggest those skilled in the art may utilize other means to adjust the output of the converter item 22 other than the reference device disclosed in the preferable embodiment of Kern utilizing a DC offset adjust reference device in order to a zero out the DC and second harmonics in the power system

In view of the above the rejection is deemed proper and hence is maintained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 7-8 and 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kern (U.S. Pat. No. 6,282,104) in view of Liu (U.S. Pat. No. 5,521,487)

With respect to claims 1, 13 and 19-20 Kern teaches a DC mitigation circuit (column 3 lines 13-36), comprising: a control circuit (item 40) for evaluating (Kern uses a feedback control loop item 30 and items 32 and 34 to evaluate the DC and harmonics in a transmission line) an amount of DC current resulting from the DC in a transmission line (such as leads 42 and 50). While Kern is silent on the use of switches for providing current into the windings of a transformer, Kern does teach the injection of a current signal by DC offset adjust device item 24 on lead 62 to adjust the DC and harmonics entering the windings of a transformer. Liu provides a teaching of using switches (Fig. 1 item 10 and 11 solid state switches comprising a IGBT or thyristor switch) for providing a current into a winding of a transformer, in order to mitigate or dampen harmonic frequencies which in turn produce the DC current in the transmission line, wherein the windings of the transformer of Liu generates a magnetic flux that offsets a flux created by said DC or harmonic current resulting from the DC in said transmission line (column 3 line 57 – column 4 line 24). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kern to use an connection to a transformer by switches of Liu to mitigate the DC and harmonics in a transmission line to simplify the device and to provide a clean and level power signal provided to loads.

With respect to claims 2,12 and 17 Kern as modified by Liu teaches the control circuit evaluates an amount of harmonic and non-harmonic AC current resulting from

the DC in the transmission line see harmonic analyzer item 38 and current transformers items 32 and 34 of Kern for example which determines whether a harmonic AC current exists or if a DC current is present and Kern as modified by Liu teach the mitigation of such harmonic and DC current would be through offset flux generated in the windings of the transformer .

With respect to claim 3 Liu teaches DC mitigation circuit is connected to an output filter (Fig. 1 item 9) for filtering an output of said switches.

With respect to claim 4 Liu teaches the control circuit is connected to a primary winding of said transformer (Fig. 1 column 2 lines 1-20).

With respect to claim 5 Liu teaches control circuit is connected to a secondary winding of said transformer (Fig. 1 column 2 lines 1-20).

With respect to claim 7 Liu teaches the switches are connected to a tertiary winding (Fig. 1 item 5) of said transformer.

With respect to claim 8 Liu teaches the DC mitigation circuit of claim 1, further comprising a capacitor (Fig. 1 item U1) for powering said switches.

With respect to claim 14 Liu teaches the current supplied to said transformer winding is provided by an internal power supply (Fig.1 item U2).

With respect to claim 15 Liu teaches the switches are used to control said current that is outputted from said power supply to said transformer winding (Fig. 1 see column 3 lines 20-35).

With respect to claim 16 Liu teaches the step of filtering said current output from said switches (Fig. 1 item 9).

With respect to claim 18 Liu teaches the switches may be integrated IGBT type switches.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kern (U.S. Pat. No. 6,282,104) in view of Liu (U.S. Pat. No. 5,521,487) as applied to claim 1 above, and further in view of Oliver (U.S. Pat. No. 5,179,489)

With respect to claim 6 Kern as modified by Liu teaches the control circuit is connected to said transformer but does not teach the connection to the core of the transformer. Oliver teaches connecting a filter to the core of a transformer. It would have been obvious to one of ordinary skill in the art at the time of the invention to move Liu's connection point to the core to increase the efficiency of the of the transformer.

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kern (U.S. Pat. No. 6,282,104) in view of Liu (U.S. Pat. No. 5,521,487) as applied to claim 1 above, and further in view of *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter.*

With respect to claim 9 Liu teaches the use of the capacitors associated with the switches but does not teach the use of the diodes used in conjunction with the switches. *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter* in Fig. 1 teaches the use of switches further comprise diodes connected across said switches so as to charge said capacitor during a frequency cycle. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Liu to use a diodes connected across the switches to discharge the capacitor an supply the transformer and filter with power.

With respect to claim 10 Liu teaches the device of claim 1 and the use of a source connected across a the switches in Fig. 1 but does not teach the use of the teaches switches being MOSFETs and diodes carry current in an opposite direction from said MOSFET switches. *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter* in Fig. 1 teaches switches being MOSFETs and diodes connected across a source and drain of said MOSFET switches so as to carry current in an opposite direction from said MOSFET switches (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Liu to use a diodes connected across the switches connected to Liu source in control the source.

With respect to claim 11 Liu teaches said capacitor discharges during said frequency cycle so as to power said MOSFET switches. *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter* in Fig. 1 teaches diodes which are configured to discharge the capacitor during a frequency cycle. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Liu to control the discharge of the capacitors.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Chou et al. (U.S. 6,717,465) teaches a state of the art harmonic suppression system for transmission lines.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Rutland-Wallis whose telephone number is 571-272-5921. The examiner can normally be reached on Monday-Thursday 7:30AM-6:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn D. Feild can be reached on 571-272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MRW

LYNN FEILD
SUPERVISORY PATENT EXAMINER